Comments on amendments to the claims

For the record, a preliminary amendment to the claims in this application was made on 5/6/04, and the above claim amendments have additions and deletions marked up relative to the claims as presented in this preliminary amendment. This observation is made of record because the office action indicates that it is responsive to the communication of 12/19/2003 (i.e., the initial filing). Since this preliminary claim amendment addressed only minor formal issues, the office action on the merits is on point, and will be responded to accordingly.

Claim 1 is currently amended to more clearly define the invention. In particular, the first set of optical components is disposed between the source and the sample. Support for this amendment is present in the application as filed, e.g., first light path 110 on Fig. 1, as described from line 5 of page 8 to line 3 of page 10 of the description. Accordingly, no new matter is introduced.

Claim 26 is currently amended to more clearly define the invention. In particular, the optical elements on the first optical path are now required to include at least a first component pair of a planar mirror and a parabolic mirror with a first focal length and a second component pair of a planar mirror and a parabolic mirror with a second focal length. Support for this amendment is present in the application as filed, e.g., first light path 110 on Fig. 1, as described from line 5 of page 8 to line 3 of page 10 of the description. Accordingly, no new matter is introduced.

Claims 14 and 31 are currently amended to more clearly define the invention. In particular, the broadband beam is required to have wavelengths in a range from 190 nm to 1100 nm inclusive. Support for this amendment is present in the application as filed, e.g., on lines 8-15 of page 8.

Claim 19 is currently amended to more clearly define the invention. In particular, a third optical path including at least a third component pair of a third planar mirror and a third parabolic mirror with a third focal length and a fourth component pair of a fourth planar mirror and a fourth parabolic mirror with a fourth focal length is required. Support for this amendment is present in the application as filed, e.g., light path 180 on Fig. 1, described from line 18 of page 11 to line 2 of page 13.

Further amendments are made to the claims to correct informalities that have been noticed at this time. No new matter is thereby introduced.

Detailed action: claim rejections under 35 USC 102

Claims 1-3, 7-8, 10-11, 13, 17, and 26-29 stand rejected under 35 USC 102(e) as anticipated by US 2006/0001883, hereinafter Brill.

Claim 1 is currently amended to more clearly define the invention. In particular, the first light path is now required to extend from the source to the sample being characterized. As a result, the optical components on the first light path (i.e., the first component pair of a parabolic mirror and a planar mirror, and the second component pair of a parabolic mirror and

a planar mirror), are all required to be disposed between the source and the sample. More explicitly, the language of claim 1 requires at least two planar mirrors and two parabolic mirrors disposed between the source and the sample.

In sharp contrast, the configuration of Brill has only a single planar mirror and a single parabolic mirror disposed between the source and the sample. The second parabolic mirror and second planar mirror of Brill are disposed between the sample and the detector. Accordingly, Applicant holds that claim 1 as amended is not anticipated by Brill.

Furthermore, it would not be obvious to modify the configuration of Brill to arrive at claim 1. More specifically, the apparatus of Brill is designed to provide a variable angle of incidence of source light on a sample by translation of a single mirror. In sharp contrast, the apparatus of claim 1 is intended to provide broadband radiation on a sample with minimal polarization change from the optical system. Accordingly, it would not be obvious for an art worker to arrive at claim 1 in view of Brill, since the problems being addressed are different in the two cases. Furthermore, art workers are reluctant to add optical elements to a system without a clear reason, since each additional optical element can increase the cost and complexity of the optical system. In particular, it would not be obvious to an art worker to add a second parabolic mirror in the path between the source and the sample, since no motivation is provided in Brill for accepting this extra complexity. Accordingly, Applicant holds that claim 1 as amended is not rendered obvious by Brill.

A further point of distinction is that Brill shows optical paths at non-normal incidence on the planar and parabolic mirrors of the first light path (e.g., 45 degree incidence on mirror 512 of Fig. 4. This feature flatly contradicts the limitation in claim 1 to "wherein said broadband beam illuminates said first planar mirror and said first parabolic mirror in said first component pair and said second planar mirror and said second parabolic mirror in said second component pair at **angles substantially near normal** to said first planar mirror and said first parabolic mirror in said first component pair and said second planar mirror and said second parabolic mirror in said second component pair". The present inventors have found that such near-normal incidence on reflective optical elements advantageously reduces polarization changes induced by reflection from these elements.

Additionally, it would not be obvious to modify the apparatus of Brill to arrive at the near-normal incidence of claim 1. Brill does not consider reflection induced polarization changes (or the minimization thereof). Furthermore, altering the apparatus of Brill to provide near-normal incidence on the optical elements would fundamentally alter the operating principles of Brill. More specifically, the purpose of the apparatus of Brill is to provide a variable angle of incidence on the sample. Altering the system of Brill to have near-normal angles of incidence on the reflective optical elements would tend to reduce the variability of the angle of incidence on the sample, which is contrary to Brill's teachings.

Claims 2-3, 7-8, 10-11, 13, and 17 depend from claim 1, so the above amendments and arguments in connection with claim 1

are also responsive to this rejection of claims 2-3, 7-8, 10-11, 13, and 17.

Claim 2 requires the beam exiting the first component pair to be collimated. Examiner draws attention to Fig. 4 of Brill in relation to this limitation. However, the description of Brill does not include any mention of beam collimation at all. Therefore, the ray diagram of Fig. 4 of Brill cannot be regarded as teaching anything about whether or not (or how) the beams of Brill are collimated. Optical ray diagrams are geometrical diagrams that typically (as in Brill) do not show any aspects of physical optical propagation (e.g. beam divergence, or relative lack thereof due to collimation). Thus Brill does not teach or suggest the further limitation of claim 2.

Claim 3 requires the beam entering the second component pair to be collimated. Examiner draws attention to Fig. 4 of Brill in relation to this limitation. As indicated in connection with claim 2, this figure does not speak to whether or not the beams of Brill are collimated. Thus Brill does not teach or suggest the further limitation of claim 3.

Claim 26 is currently amended to more clearly define the invention. In particular, the first set of optical components, through which the broadband beam passes prior to incidence on the sample, is now required to include at least a first component pair of a first planar mirror and a first parabolic mirror with a first focal length and a second component pair of a second planar mirror and a second parabolic mirror with a second focal length. Since this is the configuration of amended claim 1, the above discussion relating to claim 1 is also

applicable to claim 26. Accordingly, Applicant holds that claim 26 as amended is not anticipated or rendered obvious by Brill.

Claims 27-29 depend from claim 26, so the above amendments and arguments in connection with claim 26 are also responsive to this rejection of claims 27-29.

Detailed action: claim rejections under 35 USC 103

Claims 6 and 15 stand rejected under 35 USC 103(a) over Brill.

Claims 6 and 15 depend from claim 1, so the above amendments and arguments in connection with claim 1 are also responsive to this rejection of claims 6 and 15.

Detailed action: claim rejections under 35 USC 103

Claims 4-5, 9, 12, 23, 25, and 30 stand rejected under 35 USC 103(a) over Brill in view of Official Notice.

Claims 4-5, 9, 12, 23, and 25 depend from claim 1, so the above amendments and arguments in connection with claim 1 are also responsive to this rejection of claims 4-5, 9, 12, 23, and 25. Claim 30 depends from claim 26, so the above amendments and arguments in connection with claim 26 are also responsive to this rejection of claim 30.

Detailed action: claim rejections under 35 USC 103

Claims 14, 16, and 31 stand rejected under 35 USC 103(a) over Brill in view of US 5,106,196, hereinafter Brierley.

Claims 14 and 16 depend from claim 1, so the above amendments and arguments in connection with claim 1 are also responsive to this rejection of claims 14 and 16. Claim 31 depends from claim 26, so the above amendments and arguments in connection with claim 26 are also responsive to this rejection of claim 31.

In connection with claims 14 and 31, Examiner draws attention to lines 9-12 of column 7 of Brierley. It is respectfully suggested that Examiner meant to draw attention to lines 9-12 of column 7 of Norton, since the indicated passage of Norton relates to a wavelength range for broad-band optical design (at least 250 nm to 800 nm, more preferably 190 nm to 850 nm), while the indicated passage of Brierley does not. In fact, the system of Brierley is a single-wavelength system (e.g., lines 18-23 of column 5 of Brierley describe a laser source for FTIR spectroscopy).

Claims 14 and 31 are currently amended to more clearly define the invention. In particular, the broadband beam is required to include wavelengths in the range from 190 nm to 1100 nm inclusive, which is not a wavelength range taught or suggested by the references of record. In particular, the wavelength range of Norton is smaller. It would not be obvious to modify Norton to arrive at the further limitation of claims 14 and 31, since optical design becomes increasingly challenging as the wavelength range increases. An art worker would not be entitled to automatically assume the wavelength range of Norton could be successfully increased, if desired.

In connection with claim 16, Examiner draws attention to line 52 of column 5 to line 21 of column 7. However, the

apparatus of Brierley structurally differs from the structure of the further limitation of claim 16. In particular, claim 16 requires translation of a planar mirror A and a parabolic mirror B as a unit (i.e. without altering the relative position of A and B). The apparatus of Brierley is based on translation of a planar mirror relative to a parabolic mirror (e.g., as shown on Figs. 2 and 5). Accordingly, the further limitation of claim 16 is not taught by Brierley.

Furthermore, it would not be obvious to modify Brierley to arrive at the further limitation of claim 16. The reason for this is that in Brierley, the purpose of translating the planar mirror relative to the parabolic mirror is to alter an angle of incidence of the beam on the sample (lines 19-25 of column 3). If the two mirrors are translated together as a unit, the angle of incidence on the sample would not change, thereby defeating the purpose of the apparatus of Brierley. Since modification of the apparatus of Brierley to arrive at the further limitation of claim 16 would fundamentally alter the operation of Brierley, such modification would not be obvious to an art worker.

Detailed action: claim rejections under 35 USC 103

Claims 18-22, 24, and 32-34 stand rejected under 35 USC 103(a) over Brill in view of Brierley in further view of US 5,917,594, hereinafter Norton.

Claims 18-22 and 24 depend from claim 1, so the above amendments and arguments in connection with claim 1 are also responsive to this rejection of claims 18-22 and 24. Claims 32-34 depend from claim 26, so the above amendments and arguments

in connection with claim 26 are also responsive to this rejection of claims 32-34.

REMARKS

All claim rejections have been addressed. No new matter is introduced. Examiner's reconsideration of, and allowance of, this application is respectfully requested.

Respectfully submitted,

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